Problem 1-9

Represent each of the following combinations of units in the correct SI form using an appropriate prefix: (a) m/ms, (b) μkm, (c) ks/mg, and (d) km $\cdot$ μN.

Solution

Part (a)

$$\frac{1\ \text{m}}{1\ \cancel{\text{ms}}} \times \frac{1000\ \cancel{\text{ms}}}{1\ \text{s}} = 1000\ \frac{\text{m}}{\text{s}} = 1\ \frac{\text{km}}{\text{s}}$$

Part (b)

$$1\ \mu\text{km} = 10^{-6}\ \cancel{\text{km}} \times \frac{1000\ \text{m}}{1\ \cancel{\text{km}}} = 0.001\ \text{m} = 1\ \text{mm}$$

Part (c)

$$\frac{1\ \cancel{\text{ks}}}{1\ \cancel{\text{mg}}} \times \frac{1000\ \text{s}}{1\ \cancel{\text{ks}}} \times \frac{1000\ \cancel{\text{mg}}}{1\ \cancel{\text{g}}} \times \frac{1000\ \cancel{\text{g}}}{1\ \text{kg}} = 10^{9}\ \frac{\text{s}}{\text{kg}} = 1\ \frac{\text{Gs}}{\text{kg}}$$

Part (d)

$$1\ \cancel{\text{km}} \cdot \cancel{\mu\text{N}} \times \frac{1000\ \text{m}}{1\ \cancel{\text{km}}} \times \frac{1\ \text{N}}{10^{6}\ \cancel{\mu\text{N}}} = 0.001\ \text{N} \cdot \text{m} = 1\ \text{N} \cdot \text{mm} = 1\ \text{mN} \cdot \text{m}$$